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RETURN TO POMOLOGY
SCHOOL OF HORTICULTURE.

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GOLDSBOROUGH'S CATALOGUE

...For 1908...

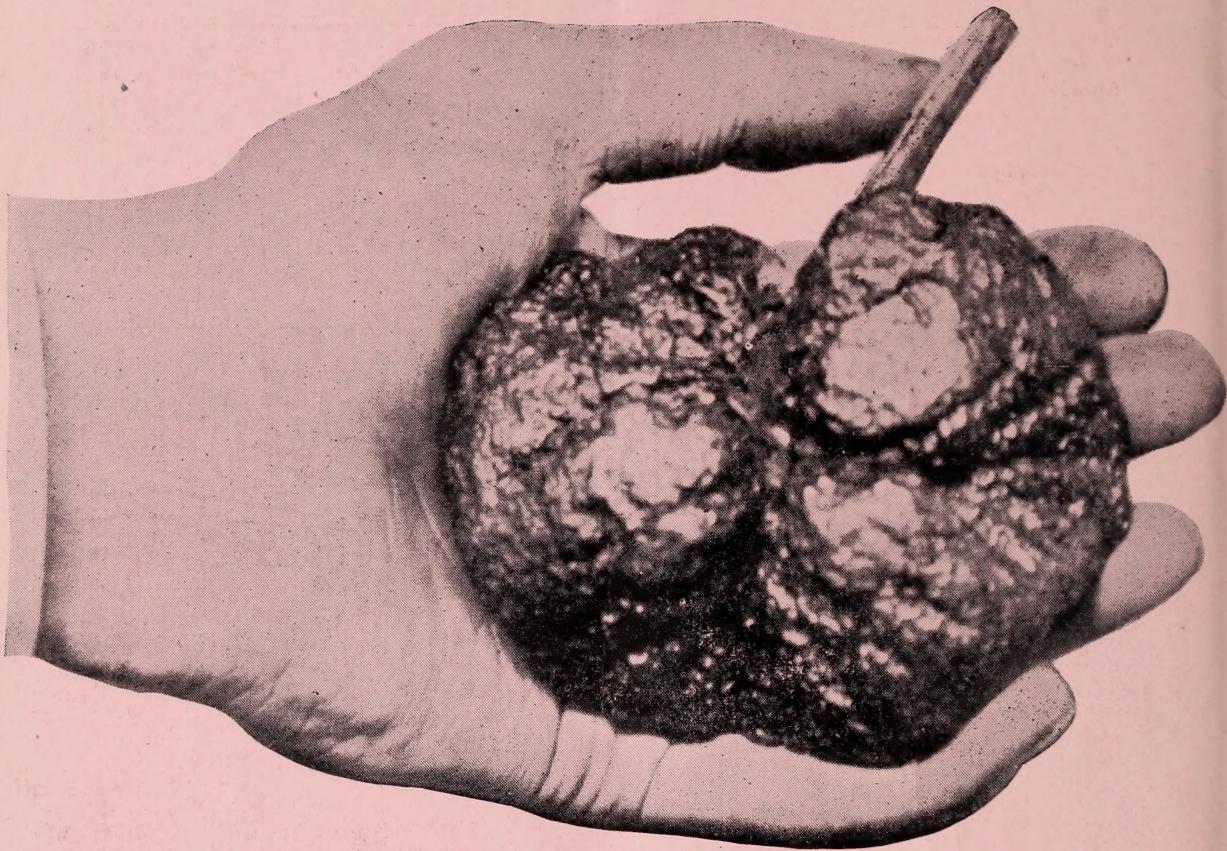


(Diploma reduced to one-fourth the size of the original. The figure on the left represents France offering to America, in the centre, that part of the earth's surface known as the "Louisiana Purchase." On the right is a youth, representing "Progress," who is about to start toward the western sun to enlighten the world.)

HIGH-GRADE STRAWBERRIES A SPECIALTY

NONE BUT MY OWN FOR SALE

Wesley Heights, Washington, D. C.



THE ST. LOUIS.—Actual Size, 3 and 11-16 inches by 3 and 1-4 inches. Weight 4 and 3-4 ounces.

GOLDSBOROUGH'S ST. LOUIS. (BISEXUAL.)

This is the result from a cross between Laxton's Commander and Goldsborough's "Heart Flush," a seedling whose parents were the British Queen and the French berry "Louis Gauthier." It therefore has no American blood. Its fruit resembles the "Commander." The plant is not as large. Leaves a third smaller and a darker green. Neither sort can be fruited twice. The "Commander" throwing out dandelion crowns producing hundreds of blossoms, none of which mature into fruit. The St. Louis inherits this surplus vigor, but directs it to the foliage, throwing off the second year countless leaf stalks, and no fruit crowns at all. Single year culture is therefore a necessity. It is a free runner maker and with good cat's teeth roots which strike quickly. Plant free from leaf or other diseases. Runners during the summer and fall do not attain much size. In the spring they get larger; yet always appear to be, from their delicate erect growth, a first fruiting sort instead of the bearers of enormous midseason berries. It is the Jersey of our strawberry field. The St. Louis has a fine sun burst of buds which show early. The blossoms are large. Being prolific it requires thinning for large specimens. The "king berries" are borne on faciated stalks, and blooming early must be protected from late frosts. These are irregular in shape. Those following are better shaped. Color, rich, bright red, of good quality; and flavor as good as Bubach

or Brandywine. Its record for size is four and three fourths ounces. I do not claim that the St. Louis is the "Largest berry on the earth" as some Rochester dealers do for their productions, yet I can say that there is no record of any larger example as far as I am aware of. A photograph and model of this and other berries of mine can be seen at the Agricultural Department. After capturing first honors at St Louis in 1904, it received many press notices and was listed in my catalogues and advertised in a number of papers. I mention this because several catalogues of this year (1908) advertise another "St. Louis." A letter from Mr. Bauer of Arkansas says that he sent his out for the first time in 1906. Now the laws of the U. S. Pom. Society give priority to him who first publishes the name. So Mr. B. is infringing upon my rights in the matter, and should change the name of his seedling.

RECORD BREAKING BERRIES—"The strawberry season just closing has been remarkable in many respects, including the usual profusion of the delicious things in their fine quality, but in the District it has been made memorable by the production of the largest berries on record. Several days ago Arthur T. Goldsborough presented to the Secretary of Agriculture some berries he had raised at his place on Wesley Heights. Secretary Wilson, astounded at their size, handed them over to Wm. A. Taylor, acting Pomologist, who took six of them that filled a quart box, and weighed them

A. T. Goldsborough, Wesley Heights, Washington, D. C.

separately in the presence of W. H. Ragan, Allen Dodge W. P. Gorsa, and Horticulturist Wm. Saunders. The average weight of each was three ounces and six-one-hundredths. The total weight of six, eighteen and two-fifths ounces. The largest berry weighed four ounces and was ten and one-half inches in circumference. Some idea can be formed as to the size of these when it is known that a one ounce berry is rarely seen in our market. A quart of berries usually weighs between seventeen and eighteen ounces, and a box of good berries contains generally between thirty and forty. It is doubtful whether a two ounce berry was ever shown in the Department before. The veteran horticulturist, Mr. Wm. Saunders, said, "They were the largest berries I have ever seen, they looked at first like tomatoes."—From Evening Star, Washington, June 17, 1899.

Having tied the English record with a four ounce berry, I have ever since tried to originate a sort, with which to make a new record. Last spring selecting runners from the best fruiting seedlings of 1904; I gave them special culture, and having a favorable season produced berries of very superior size, shape, flavor and color. As heretofore they were taken to the Department of Agriculture for verification of weight and measurements. The largest berry tipped the scales at $4\frac{3}{4}$ ounces and was $11\frac{1}{4}$ inches in circumference. It was weighed in the presence of Colonel Brackett, U. S. Pomologist, Prof. W. N. Irwin, Prof. W. H. Ragan and Mr. H. M. White. The following official letter I take the liberty to print.

U. S. Department of Agriculture.
Bureau of Plant Industry.
Office of Pomologist,

Washington, D. C., Jan. 24, 1905.
To Arthur T. Goldsborough, Esq.

Dear Mr. Goldsborough.

"On June 5th we received from you a specimen of your new strawberry, named "St. Louis." We took exact measurement of this remarkable berry, and found that it measured $3\frac{1}{4}$ inches by $3\frac{11}{16}$ inches in diameter. Its weight was $4\frac{3}{4}$ ounces. This beats all records in the size of strawberries. A photograph was taken, a copy of which I am pleased to furnish you. A model was also made for placing in our museum. You have certainly worked wonders in the production of new varieties of strawberries. If you keep on increasing the size as you have in the past few years, we may expect still more wonderful results."

Yours very truly,
G. B. Brackett, Pomolog'ist.

On June 7, 1904 I expressed 12 strawberries of my new seedling. "St Louis Prize" and 12 duplication gooseberries to the St. Louis Exposition. Owing to the courtesy and promptness of the Superintendent of Pomology, Mr. John F. Stinson, they were benched at once. Arriving at the Exposition myself in September, I was assured by this gentleman that my berries "were far larger than any others shown at the fair." In due time a notice was received from the "Jury of Awards," stating that I had been allowed the highest awards (silver medals) for both exhibits. Gold medals

were reserved for those who had the best collection of fruit. The strawberries average about two ounces each, the largest specimen scarcely $2\frac{1}{2}$ ounces, or about $\frac{1}{2}$ the size of those I took the past season to the Department of Agriculture.

MAMMOTH STRAWBERRIES—Mr. Arthur T. Goldsborough, of Wesley Heights, Washington, sent to The Sun one of the largest strawberries of the season. It was the smallest of five which more than filled a quart box. The one received is over three inches in diameter. The largest of the five, Mr. Goldsborough writes, weighed nearly five ounces. It was weighed, photographed and measured and will be modeled for the Pomological Department of the Bureau of Agriculture. The variety has been named "St. Louis" by Mr. Goldsborough. It was from the seedling which took the highest medal award at the St. Louis Exposition.—Baltimore Sun, June 6, 1905.

MIGHTY FINE STRAWBERRIES—For the last three or four weeks the Maryland strawberries on exhibit here have been one of the chief centers of attraction. This state leads the Union in growing these berries, many of the finest varieties having been originated by Maryland growers.

The varieties—Taft, Longworth and Outlander—originated by Arthur T. Goldsborough of Wesley Heights, Md., are as fine as any berries ever shown. They vary from five inches to eight inches in circumference and weigh from two to four ounces.—Norfolk Pilot, June 1907.

GOLDSBOROUGH'S "TAFT." (PISTILLATE.)

I desire to state that foreign blood predominates in all of the strawberries I have for sale. My rule is to cross out to get new types, and in as close as possible to keep them. My stock is now almost pure bred English sorts with American Constitutions. The breeding of each kind is given—not with the aim to sell "Pedigree" plants, but for the information of those who might wish to use my plants as breeders. "Taft" was fruited in 1906, and is, in my humble opinion, as near perfection as any sort I ever expect to see. It is a large "Queen" without its plant weakness. There may be some small fruiting sort as sweet, juicy and well flavored, yet no large fruiting sort having these qualities so fully developed is now before the public as far as I can learn. Fruit round and regular. Color dark red. Flesh same color. Its prominent yellow seeds are well spaced. Flavor sweet and rich. Fragrant and juicy. Season second early and long. No single stem berry is larger, shape considered; and no sweet sort more prolific. Blooms and fruit protected by large round leaves. It makes just the right number of good, strong runners, and its foliage and roots are thus far, extra healthy. It can be fruited twice or oftener, but for best fruit and private gardens I advise always single year culture and narrow rows. Largest berries are produced from summer or fall setting if lifted with plenty of soil. I never saw a big strawberry picked from a spring set plant. If you have a taste for a sweet, true strawberry flavor, grow the "Taft." No sweeter than "Goldsborough" but one third larger. From the thousands of seedlings fruited in fifteen years or more I selected this as the nearest ap-

proach to an ideal strawberry. Do not confuse my "Taft" with the "W. H. Taft", a seedling sent out this season by a Binghamton, N. Y. firm.

GOLDSBOROUGH'S "OUTLANDER." (BISEXUAL)

Name suggested by its long runners and far flung fruit stalks. In the Haverland class as to type—omitting its defects and improving its good points. Like its half brother "St. Louis" it makes its growth in the spring, reaching fine size and vigor. The spring fruit stalks are thrown out almost a foot from the collar of the crown. The peduncles are not close, but widely spread and the pedicels are extra long. Leaves are large, and by tucking the fruit tresses under the leaves of its neighbor they are protected from sun and rain. These agents were very destructive to the Haverland, but the "Outlanders" having a dry, thick skin, fare better. An early frost was also hurtful to the Haverlands; fortunately, the "Outlander" is a very late bloomer. The "Outlander" is unique, and one of its distinctive traits is its habit of developing the king berry MUCH in advance of the rest on the truss. After it is picked the rest are better sap fed and reach a fine, uniform size and exceedingly attractive in shape and color. They are oval, with a neck, and handsome green calyx which flares back on the pedicel making capping easy. They show up well in the crates, and should prove good shippers. Some of the king, or first berries, weigh over one and a half ounces. A row of "Outlanders" with large fruits spread around each plant, painting the soil with their bright color, is a beautiful sight. Its runners root quickly, but the second node on the strings is small and in single year culture should be cut off. Colors up evenly, a bright red with darker hue where the sun strikes. Flesh pinkish. While not an acid berry its flavor is only fair. A shy crown maker and would fruit well on old plants. Every blossom makes good. Outlander is a contender for the "Wilder medal" and was the best of the sorts exhibited by me at Jamestown Exposition, where I was awarded the Gold Medal for the largest strawberries.

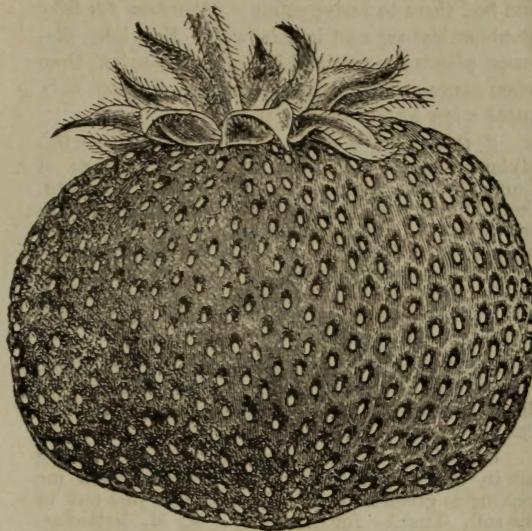
GOLDSBOROUGH'S BATTENBURG. (STAMINATE.)

This sort is not very tall but stocky, with ample foliage for bloom and fruit protection. Is healthy and vigorous, crowning up well and sending up fruit stalks as the season advances. This habit prolongs its season and makes it later than the Gandy. At least when Gandies are too small to pick, good Battenburgs can be found. Runners are strong and well equipped with cat's teeth roots making it an easy sort to propagate on the cutting method. It blooms late. The king berry is not the main berry on the first truss, as usually the case, but is carried on an independent fruit stalk. Each plant turns out one of these fruit stalks. The main berries on the trusses or clusters are also of great size and very many of them. Runners are

without internodes. Like all great croppers, its fruit lacks sugar and flavor. Its color is not attractive and the early berries are badly shaped. The later pickings are of better shape, color, quality and flavor. With so many undesirable points it might be asked, why introduce it? In the first place, many growers like quantity rather than quality, and buyers are not as discriminating as they should be. The success of the Keifer pear, the Ben Davis apple and Excelsior strawberry prove this. Besides the Battenburg has several points to commend it; unusual size, productiveness and late bearing. Although the "St. Louis" has borne a larger berry, it was carried on a strap or faciated stem in which two or more stems were united. "Battenburg" has produced many berries running from two to four ounces on single stems. It does not bear as many fruits as "Parker Earle" or "Phil Krates," yet the yield per plant by weight I think would equal any sort. Set a few Battenburgs, alongside those of the Rochester claimants, one "Noted as the biggest strawberry on record" and the other as "The biggest berry on earth," and judge for yourself what warrant there is for such statements. Culture—Varieties which have big stools with many crowns should not be grown in matted rows, nor fruited twice. Many fine sorts have been turned down simply because the buyers did not know their special needs. The soil they stand on is too exhausted by its countless roots to depend on, and as each of its crowns send forth runners they become too thick to do their best. The best culture then, is to lift the early runners and make a new bed, or after fruit is picked, mow off the tops and thin the crown to two to each hill, allowing them to stand eighteen inches apart. Put the soil around them in good condition and let runners come for the next crop.

THE "GOLDSBOROUGH."

The British Queen being for the past sixty years the English standard for flavor, I have been extremely anxious to transmit this berry's desirable qualities without its defects, for it shows a green tip and suffers almost to extinction from leaf spot, rust and blight. Believing with the French, that we must cross with the wild sorts to get good hybrids I have for seven years used seed from a cross between "Queen" and our common wild sorts, but there would always be something wanting in the seedling. When the fruit was right, the plant would be wrong. When the plant was right the fruit would be wrong. When fruit and plants were satisfactory, the runner would be spindling, rampant or too long or short. When all these parts were right the fruits would be small, badly flavored or shaped. In fact I experienced the usual trials known to the hybridizer. Among my 1904 seedlings there were several likely ones, and after two years trial one of them reached a point of perfection, far beyond my expectations. In fact was so nearly an ideal in fruit, plant and runner growth that I determined to identify its origin with myself in order



to get the credit of producing it. So it bears my name and whatever little reputation I have as a strawberry specialist is staked with it. The "Queen" is tall but the "Goldsborough" is more erect and tops it by a few inches. While its berries are not extra large nor numerous, they are above medium size, and all come to perfection in color and flavor. The shape of the fruit is perfect, color also, being a waxy light scarlet, with deeper shade when full ripe. Its red pulp leaves a red juice in a saucer like its wild parent of the fields, a quality almost bred out by the introduction of the South American sorts which are white fleshed. It ripens a little later than the first earlies. On this place about May 20th. Is rich, juicy, sweet and fragrant. It requires no sugar and the only early berry I know which can be freely eaten out of the hand. While visiting England I saw people at the Railroad Stations buying strawberries sold in paper packages and eating them as freely as we eat peanuts here. Since then, I have had a persistent wish to originate a berry which could be thus sold at stations and fruit stands unaccompanied by a package of sugar. Thus increasing the demand and consumption of this wholesome fruit and undoing the prejudice caused by the old sour cored "Wilson" which make many fear to eat strawberries. The consumer estimates a sort by its fruit only. Not so the producer. If a sort has bad growth or plant habits it is soon condemned. A plant having a tender leaf, one that blights, spots or mildews, no matter how good its fruit may be, soon goes to the wall. Other defects, such as a dry or close fitting cap, bad runner habits, want of health, etc., may also knock it out.

If runners are rampant they must be thinned out, entailing too much labor for the small difference in price. If runners are spindling, hard to root, or put out side shoots (lateral runners) before they strike, as the Louis Gauthier does; there is more trouble for the culturist. Fortunately the

"Goldsborough" has not a single runner defect. They start on strong medium long strings, and root before sending out a second layer. They come out slowly, and are never too many. None are sterile. Some of the flowers are perfect, others imperfect as to sex. Buds grow on reclining stalks, about four inches long, close enough in to be perfectly protected by its big leaves from frost, rain and sun, yet not so close as to interfere with picking and mulching as is the case with "Warfield." Its dark foliage is so fresh, sappy and green; its hidden fruit so red, glossy and sweet that it is a pleasure to work among the plants, I do not believe in matted rows, preferring late summer planting, (cutting system) and single year culture. The "Goldsborough" is adapted for any method. Judged by my card, it scores 95 points as against 90 for the Brandywine which in my opinion has more good points than any of the standard sorts.

Manche, France: My strawberry plants received this a. m. Gandy and Mexican have leaves as fresh and green as when dug. M. Gamillono.

GOLDSBOROUGH'S PHIL KRATES. (STAMINATE.)

This is a crown maker and very prolific. The blossoms are perfect and open late. Plants healthy. Fruit is grown on trusses which look like an outstretched hand. Size of fruit runs from medium to very large. Flavor only fair, and quality rather against it for long distance shipments. Color light red. Shape good. None of my berries are dry, pithy or sour. Midseason. Like all great croppers, its runners cannot be left to shift for themselves. Single year culture and narrow rows the best.

GOLDSBOROUGH'S PRINCESS ENA. (PISTILLATE.)

Strong healthy plants, making few runners which catch quickly. A midseason short. Coming in a little later than "Taft" and Outlander. An early blooming pistillate. Berries round, and the king berry larger than the "Goldsborough." Rich, juicy and sweet. It is not as prolific as some others yet so delicious and finely colored that I commend it to all those who have epicurean tastes. No lime nor too much manure. Common culture.

GOLDSBOROUGH'S FUJIYAMA.

A large plant yielding many very showy berries. Needs further testing before being offered to the public.

TREATMENT OF STRAWBERRY PLANTS.

Buyers receiving plants by post or express, often ask for transplanting directions. I have catalogues and articles directing them to dip plants in water as soon as received. One man wrote that his plants died altho' he had been "careful to place them in water all night before setting." No treatment could be worse; for dry roots absorb too much water, and the plants having few leaves to conduct

it off, crown and root sets in. The best method is to dip the roots at once into thick clay muck. In fact strawberry roots should never be washed even by the shipper unless dipped at once into some mixture which will coat them over. Some receivers write that I have forgotten to punch a hole in the tin, so as to admit air. To save writing I wish to assert here that neither plants nor fruit need air while travelling. (I have gone to endless study and experiment to prove it). Having your ground ready and marked off by a sled marker, make a shallow furrow down each row. Take up a hand full of soil (from a basket of prepared soil if you wish to be over nice) place it in the furrow, making a little mound, and spreading the roots place them saddle like over the mounds. Put soil on top of roots, and press it down firmly, give a generous watering and cover with enough earth to fill up the furrows. Don't allow surface to bake, mulch or keep the top always loose for $\frac{1}{2}$ inch or so. Don't work about strawberries when ground is wet as this induces rust. Don't let young layers root around the parent plants; but cut off runners above the internodes as soon as its tips show roots $\frac{1}{4}$ inch long. Root the tips in a moist shaded bed. If you do layer by the side of parent plants, don't take them off all at once, because the loss of leaves and stems is felt by the parent plant, which is unable to assimilate the sap and moisture, sent up by the roots and a congestive condition ensues and it becomes a prey to every known disease. Freshly set plants require shade till the roots are well established.

One fancy priced plant, bought in the fall and wintered over in a cold frame, a little all the winter, gets an early start in the spring and at transplanting time is worth two or more spring dug. The above refers to garden and not to field culture. Catalogues mailed to any names you may kindly send,

I was, as far as I am aware, the first shipper to use old tin cans for mailing strawberry plants. I have mailed them to every State and to France,

and had them to arrive safely. All orders for fifty plants or less are sent in this way. For long distance plants are received in better condition than when expressed in boxes or baskets. I shall only quote a few letters on this point:

S. Glastonbury, Conn., August 16, 1897:—"Replying to yours of the 14th, the mailed package of Louis Gauthier plants you addressed to Hartford, Conn., but it turned up here one day late, but wishing to test it I left it unopened for five days, and when opened, found the plants in perfect condition, with no trace of heating in any way, seeming to indicate that your sealing process was just the thing for transportation of green plants in summer weather."—J. H. Hale.

St. Georges, Bermuda, February 28, 1897. "Gauthier plants came in prime condition, and are doing splendidly. I am delighted."—N. H. McCallum.

Strawberry plants received. Thanks to the can in which you sent them. They reached me looking as green and as fresh as though just out of the soil. Thanks for liberality.—A. M. Peticolas, Victoria, Texas.

Dickson, Wayne Co., W. Va.:—Strawberry plants received today in fine condition. Not a leaf wilted nor a root died. Thanks for extra count and promptness—Lee S. Dick.

Manche, France:—My strawberry plants received this a. m. Gandy and Mexican have leaves as fresh and green as when dug.—M. Gambillon.

Milford, Delaware, Nursery:—Strawberry plants came promptly to hand in most excellent condition and are strong and handsome. Thanks for extras. Your method of forwarding is surely new and cannot fail to please your customers.—Alexander Pullen.

Union Fruit Co., Mountain Grove, Mo.:—If I lose any of my plants I wont blame you, for not one of them has even wilted.—H. Gugel.

Arkadelphia, Ark.:—Plants received, and I must say in better condition than any I ever received from either a short or long distance.—John R. Boddie.

Bayou Labatre, Ala.:—The strawberry plants came to me in the finest condition imaginable. Looks as if just from the bed. Kindest thanks for extras.—C. M. Ingersoll.

Duplication Gooseberry.

See Illustration on Last Cover Page.

U. S. Department of Agriculture,
Bureau of Plant Industry,

Washington, D. C., July 21, 1903.

"These specimens of the "Duplication" gooseberry were furnished to this office by the originator, Arthur T. Goldsborough of Wesley Heights, Washington, D. C. Largest specimen weighed .64 ounces (64-100 of an oz.) avoirdupois, was one and nine sixteenths (1.9-16) of an inch long by one and four sixteenths (1.4-16) in diameter.

Twenty-five (25) berries weighed 12 ounces and 32-100 ounce or .493 ounce each. Thirty three berries weighed one pound. "They were the largest gooseberries ever seen at this department."

Very Respectfully,
G. B. Brackett, Pomologist.

In 1890 I sowed some cross fertilized gooseberry seed and got quite a good stand of seedlings. A majority suffered from mildew. Some were free of it, and made fruit in 1895 superior to any American sort. Two of them were almost identical to Eng-

lish—American varieties. In 1896 I destroyed all of them but one which I called "Duplication" because of its likeness to Columbia and Triumph. The fact is, a cross between the English and American sorts is apt to result in many duplications and will lead to endless confusion as to names. Practically there is small difference between "Columbia," "Gracilla," "Carmen," "Triumph" and "Duplication." A grower having any one of these might be excused for not wanting the others. "Duplication" the last season was a little larger than Columbus, 27 berries weighing as much as 30 of the Columbus. If you only have "Houghton," "Pearl" or "Downing" by all means send for "Duplication" and see what a gooseberry looks like. The bushes are very vigorous, upright and free from mildew or other disease. Fruit are whitish green color, as large as English sorts, and of

excellent flavor and fine to eat out of hand. If not grown in tree form its branches must be tied up as it is full of berries almost as large as pigeon eggs. I have a government photograph of one twig seven inches long surrounded by 18 one inch berries which almost touch. The great advantage these large sorts have over the small is in their early marketing. They rarely ripen earlier, but by June 1st., the Duplication bushes can be thinned, and the culls bring 8 or 10 cents per quart which is more than Downing brings when ripe three weeks later. On June 1st., the Downings are no larger than hulled peas while the Duplication culls are larger than Downing or Houghton ever get. I pick many Duplication over half ounce each which is about the average of Crescent strawberry.

Swarthmore, Pa., May 12, 1906.

Dear Sir:—“The “Duplication” is certainly a wonder with me. I have all the big American—English hybrids and several pure English sorts. Duplication was by far the largest. Some people to whom I showed them and who had never seen any but the old fashioned sort, insisted that they were plums. This is not a “jolly” but actually true. My gooseberries are set between grapes which are on a trellis 10 feet apart. They have never mildewed, while Columbus and “Triumph” planted in the open, have, even when sprayed with liver of sulphur and bordeaux.

Respectfully, H. I. Ireland.

Have many gooseberry, raspberry, currant and blackberry seedlings under trial but so far, none but the “Duplication” have been good enough to send out.

PRICE LIST

	12	25	50	100
Goldsborough's Taft	\$2.00	\$3.50	\$6.00	\$11.00
Goldsborough's Outlander.....	2.00	3.50	6.00	11.00
Goldsborough's Princess Ena.....	1.00	2.00	3.50	6.00
Goldsborough's St. Louis	1.00	2.00	3.50	6.00
Goldsborough's Battenburg	1.00	2.00	3.50	6.00
Goldsborough's Fujiyama.....	1.00	2.00	3.50	6.00
Goldsborough's Goldsborough50	.75	1.00	2.00
Goldsborough's Phil Krates.....	.50	.75	1.00	2.00
Goldsborough's Duplication Gooseberry.....	2.00	3.50	6.00	11.00

NOTE.—Owing to frequent duplication of names, to avoid confusion I request that dealers in listing the above should prefix my name. Also in descriptions give bad as well as good points of each sort.

CULTURAL NOTES

Watering.

As I have said elsewhere, the strawberry is a great drinker. So much water is pumped up by its ample foliage and quickly liberated by its thin leaves (which would quickly burn if not freely supplied) that if not watered in the absence of rains, no success can be expected. Don't wait for rain and fear that it might be too wet if a wet spell sets in. If your land is well drained it is almost impossible to over do this water supply. In July 1903, I visited Mrs. Hearst of California, and stopped at her hacienda for three months. During that time there was not a drop of rain and rarely is between May and October. There was not a day when strawberries were absent from her table. The air was so hot and dry in the day time that grass and everything green was burnt up except a few trees which had thick leaves, and those standing on low ground. When the soil is capable of being cultivated, and moisture conserved by this dirt mulch, vegetation did not seem to suffer. I was anxious to see how strawberries stood a sun bath hotter than we ever have it here, and made several visits to the patches. There are many tanks or cisterns on the place, and powerful pumping engines to supply the vegetables, fruits, flowers and shrubbery. 300,000 gallons are daily used. The strawberry beds are so constantly irrigated that I could not pick the berries except by using a board to walk on, as the mud

I might say was over my shoe tops. The picking was daily done by bare-footed Chinese. At first thought one might suppose we could also ripen strawberries during the hot months by irrigating our fields. I doubt it. There the nights are always cool to cold, rarely rising above 56, and as the foliage shades the soil the roots are never heated. The heat in our nights would encourage the growth of fungi, mildew and insect life that could not flourish there. Back from the coast, the air, has such avidity for moisture that it takes it up and no mist forms over the patches. Here it would form every night, and the berries would, with the addition of rains, rot badly. Do not stir the soil around the plants when the ground is wet. If you do, expect rust and spot.

Garden Culture or Renewal Methods.

The strawberry is so responsive to petting that most gardeners delight to work among them. The matted row men flood our markets with small, cheap, sour berries. I do not discourage the sale of these crops, for the poor cannot afford to pay the extra cost which high culture demands. Nine tenths of the growers (commercial) favor spring planting. There are several reasons for this choice of method. In the first place, when the strawberry is grown as a side crop, from one to five acres, the picking time comes when your other crops need at-

tention. If it rains much—generally does—the weeds have a good start, and as soon as picking is over they are jumped upon and the matted row system allows them to neglect the beds for a while, not so the renewal system, for it must begin as soon as the berries are off. In the second place, single culture requires far more skill and more attention to details than the average truck-grower or farmer cares to give to this crop. To learn how to grow standard sorts is within the reach of any man who successfully raises kitchen vegetables. Varieties that require special culture and the care of those sorts which cannot be cropped twice, calls for more information than they are willing or able to obtain. If nine-tenths of our growers here, prefer the matted rows, nine-tenths of the English growers prefer the narrow row or renewal system. You get two crops and richer land by the last system and one crop and exhausted land under the first. If your soil is infested with wire or Bermuda grasses a second crop is impossible. The lack of space prevents my going minutely into the details of this single year method which will be treated more extensively in my forth-coming work on "American Strawberries." It is not necessary to grow a special row for plants. The rows which were thinned for large fruit can be worked for runners. Other rows can be ploughed under and prepared for late potatoes, lettuce, cabbage, beans, etc., etc. If your plants are of a scarce and valuable sort, thin out and let the first runners root, or take them off and force them into shaded beds till well rooted, and then set out in the open, say one foot apart in rows 30 inches asunder. Allow each plant to send out four or five runners and keep the rest cut off. If the runners are allowed to set around the old plants which, of course, have been hoed or put in proper condition, you can lift them during a rainy spell and set out where they are to fruit, and when strong, they can be allowed also to make runners enough for a narrow row, and a mulch of lawn clippings can be put around them as soon as set out. It will keep down weeds, shade and cool the soil. If your sort is a crown maker like "Battenburg" or "Parker Earle" allow no runners, and set 10 inches apart in rows 20 inches asunder. A small mule and contracted cultivator can be used with this space. For winter protection use well rotted manure or any kind of straw, vine or rubbish. The very best mulch is leaves. To prevent them from blowing off, haul into your hog pen and let your hogs root them over and cut them up with their hoofs. Throw them over the fence and haul more in, till you have enough to mulch your patch. If ashes are sprinkled over the pile when you are adding to it, they will help to rot the mass. This is ahead of any mulch that is found or made. No seed in it, and none will come up through it. The hogs moisten and enrich it enough and leaves darken the soil and must carry much plant food as they constitute the chief sustenance for the trees in wood lands. Soap suds thrown over the pile is also beneficial. There is in the strawberry vines 8 per cent.

of soda, and in the fruit more soda than potash. Too much salt will hurt, but a little is needed.

Manures.

Few vegetable growths are so exhaustive to the soil as the strawberry, probably for this reason: Nature gave them the power to stride away to fresher soil. If their roots ramified and ran as far as the grape, there would be no necessity for the runner. Raspberries and blackberries have much the same system, except their roots are not so abundant, and have the lateral ones, answering to the strawberry layer, equipped with roots which emit buds along their length. If, therefore, you wish to fruit an old plant more than once, you must bring its food to it, and it must contain all the component parts that its roots require. When you water, drench the plants. It helps to carry off the excrements which light sprinkling does not. One species lives upon the excrements of another, but never, I suppose, upon its own. I have never bought a pound of artificial manure, called guano or fertilizer. If you know a trucker or farmer who has a mortgage upon his lands, you will find that a guano firm holds it. If it helps, then the man who does not use it should be the encumbered party. By better methods, such as soiling his cattle, and turning down clovers, beans, rye and other green crops, he saves the guano bill and builds up his land, instead of overdrawing his account by stimulants. The "corn-tassle" is fooled by the smell of the handful of guano, and so is the man who smells the forkful of nitrogenous manure, the excrements of the horse and mule. Ammonia or nitrogen induces a vegetable growth, an out-of-balance plant, and is, I think, the cause of many root troubles which show on the leaves. Horse manure may do no harm if put on as a winter mulch, but from March to November use none. Sheep manure cannot be had in great quantities, but is the best when mixed well with the soil. Cow manure scrapings from the cow yard is also valuable. All of them detract from the flavor of fruit. If you can get enough leaf mold, or can turn under a good growth of any green crop, you can get a better yield of sweet strawberries than from the use of any of the above. As this is not possible with large plantings, I recommend the following compost: Build a pen, say, 20 feet square. As a foundation, haul in several loads of sod. Haul leaves and other rubbish into your hog pen (dirt bottom). After they have hoofed them down for a week or ten days, cart them out and place on your compost, and haul in more leaves for the hogs to enrich and cut up. Put a cart load or two of woods earth, or form a bank, on the compost, and alternate with hog-pen material. The kitchen stove ashes (wood) can be thrown on, also soap suds. Keep the compost moist. When decayed enough, remove your enclosure and mix it by chopping it down. The use of liquid manure is attended with such fatal results if overdone that I do not recommend its use to any but men of skill and experience. The weather, the variety, the time of day, the quantity, the period of growth, the season, the ingredients,

are all to be considered if you do not wish to do more harm than good. A bushel of very mellow, rich soil thrown into a barrel of water is all that I would trust a novice with.

Small Plants.

A Pedigree concern says, "We dig up all the plants in the rows," and they might add, "and send them out." It ought to grow rich from selling what other dealers have to throw away in culling—tail-enders, internodes and culls. Their patrons receive them under the delusion that, however small, they possess "built-up organisms" and "perfectly balanced parts"—not found in "common plants." They are gulled into the resemblance between the "innards" of the watch and the root system of the strawberry photographed alongside. The plant, of course, can't run down, because you know it has the guarantee of the grower. Doubtless the picture of the watch helps the firm to work off these small gold bricks; especially the words printed beneath the plant and its runner—the watch. Another example, as good as any they give, of "bud variation." Here is their own description of these Siamese twins: "The value of a plant cannot be determined by its size (?) any more than a watch can be judged by its size. The most valuable parts of this plant cannot be seen by the naked eye, but, like the watch, is a regular network of perfectly balanced plant machinery." That the value of a plant is determined by its size is well known, and good large ones could not be sold at less than two cents each. They require room to attain size, and why dig and sell when their fruit would bring more than two cents? Big-growing sorts do not always produce the best fruits, but big plants of any given sort are better fruiters than small ones. I might add that a "pedigree" watch might be so small as not to last as long as one less "restricted."

Fructification.

I read constantly that you must not water the plants when in bloom. I believe that it is just the other way and that they need watering. Under this belief I do it constantly, with gratifying results. Though rainy weather may prevent pollen transmission through the air, and prevent pollinating insects from flying, watering would burst the pollen bags lodged in the pistils in dry weather, and carry them down if in the circumventing air, and also aid in the development and prevent the drying out of the receptacle of pollen in dry weather. In pollinating, do not hope to get any certain result after the bloom has expanded, for you may find that all the stigmas have been fructified before you applied your brush. Open your bud, remove the anthers if any, paint the stigmas with your pollinated brush, and set your bell glass over the pot. Even then you cannot swear to your cross, owing to disturbances, the chief of which is that you can't be sure that nature was not ahead of you, even though the petals of the corolla and calyx were tight down and over your bloom before you opened it up. If your bloom had been a hermaphrodite, the creative act may

have been done before expansion, although one would suppose the pollen grains would not be ripe enough to have burst. But in the case of a pistillate subject, how could any pollen reach the stigmas before it opened? Here is a mystery as deep as Fundy bay, and makes me ask if pollen, falling on top of the calyx, which has a spreading cup formation, could not be carried down by some process, to the stigmas below. Here are two experiences to the point: I keep my berries for crossing in a little hothouse, which forces the bloom a few weeks ahead of those in the open. One morning I took a pot containing a hermaphrodite, removed two open blooms and the smaller buds, leaving six from which I carefully removed every stamen. After pollinating one flower I was called off the job, and placing the jar over the pot took it back to the house, and neglected to attend to the other five till ten days later, when I was surprised to find the five look as though set; which proved to be the case. A few days previous, wishing to see how a pot of purely pistillate sort would behave in the open in a warm corner of a cold frame, I set it there. A frost the same night killed two blooms nearly expanded, but six or eight of the more advanced blooms set to fruit. Strawberry beds in the open did not bloom for two weeks. Could pollen grains, falling upon the cup made by the flaring of the calyx petals, be carried down by dew or rain so as to fructify the stigmas before they are exposed by the expanding of the calyx and corolla petals? As a mist or dew laden atmosphere would burst the enveloping skin of the pollen grains, their contents would be discharged in the air—would their potency be destroyed? If not, the very dews of Heaven may be pregnant with fructifying fluids. Here is a nice field for inquiry. If the mistakes of even eminent horticulturists of the past and present in strawberry culture are to be discussed, I should require a bigger book than this. I can only briefly allude to those which, in my humble opinion, are misleading. Downing said: "The strawberry properly belongs to cold climates, and though well known is of comparatively little value in the south of Europe." It is known now that it adapts itself to all climates.

Mr. Charles A. Peabody, one of the best authorities on this fruit, after calling attention to the fact that the first blooms were staminate and never productive of fruit (which is true only of certain varieties), goes on to say that "the pollen of the strawberry viewed through a microscope is a hairy substance which, upon ripening, bursts and floats off on the least breath of air." Pardee and others quote him, and probably many have gotten their impressions of pollen from this source. He must have had a queer microscope, and I can only explain his mistake by supposing that he had gotten hold of some of the long, thread-like styles from the receptacles. One would suppose from his description that the pollen grain, after bursting, floated off like dust or eiderdown. As a matter of fact, the pollen grains released from the anthers are egg-shaped bags or sacks containing, not dust, but a

semi-fluid or jelly, which without winds would fall to the earth from their specific gravity. During dry weather these grains of pollen when once lifted, being fine, would be carried some distance. As moisture expands its skin to bursting, the fate of those caught in mist or rain can well be imagined, as their contents would be brought down by the rain.

I wish to digress here to mention another popular belief. You will hear it often said that the strawberry needs sunshine, and wet weather makes them sour. Let those who believe this fallacy observe hereafter, and they will find that when the weather is dry and hot, the berries will be sour, while incessant rains increase their sweetness. It is in cool, rainy Ireland that one picks the sweetest strawberries. In all my experience I never saw such sweet berries as grew here last year, and it rained so persistently and hard that there was scarcely a clear day from bloom to fruit. The causes for the presence of sugar in the strawberry may not hold good with other fruits, although they should with all quick-ripening species. In the first place, rain cools the soil, and the sugar-forming element, or salts, in a wet soil can come to the roots laterally and wash away the excrements or waste matter. For a plant has only a limited amount of saccharine salts within the radius of its root system, and (as I said elsewhere) where a great number of fruits are set there is not enough to sweeten so many; and, without exception, all good croppers are more or less sour. So in a dry soil the needs of a fruiting plant are ill supplied. Rain and cool, cloudy weather retards ripening, and the roots have time and opportunity to gather nourishment; for be it observed, that a strawberry lives from hand to mouth, and the plant has not the stored-up sap energies found in the apple or pear. As I said, rains hold back maturity; dry weather hastens it. There is no sugar in sunshine per se; there is in rain water. And no worse misfortune can happen to your beds than a hot, dry day or two, coloring up your berries before they are ripe, large and sweet.

Show Berries.

Buy a sort that throws double and semidouble blooms borne on strap stems. Although these sorts are originated on poor soils, after the habit has been fixed by seed selection, they give better results when grown on rich soil. These fasciated berries are the first bloomers—called “King berries.” As soon as you have your blooms you can begin to work them for best results. You must have some experience in strawberry culture to know the little details which I have not space to mention. As no two seasons are alike, you must know also how to provide for or against any new conditions which may arise. Of course the fruits must be thinned so as to throw more nourishment into those which are left. You cannot get abnormal fruits under normal conditions. You here bob up against your first obstacle; for the effect of thinning is different upon different sorts. No general directions can be given as to number left, or when too thin. Some

sorts resent this treatment by wilting or rotting what is left on—too much sap I suppose. Others persist in throwing up more fruit stalks to recover their loss. Others again, seeing their seed reproduction jeopardized, throw their energies to runner making. Some sorts increase the few greatly; others very little. I used to sink tin cans by the side of plants with nail holes in their bottoms to feed the roots constantly. After wilting and rotting some valuable examples, I ceased the practice. It is a good plan though, when you are working your plants for runners. The better way to supply water is to put a thin mulch around your plant and water the surface, never letting it get dry. A slight shade (mosquito netting) should be put over the plant and something thicker over the berry itself to shield from sun or pelting rain, birds or insects. By keeping the berry shaded and moist soil around it, you can retard its ripening. Do not allow ANY ONE to touch it, as a slight injury to the fruit stalk will cut its size. After ripening, handle by the stem, as pressure would cause bleeding and loss of weight. Now don’t claim that your berry was as big as a goose egg unless you have at least three competent disinterested witnesses to the weighing. I read frequently of large berries and large crops spoken of as “record breakers” that are mere opinions, and worthless to those looking for facts. I grew a berry once, larger than any I ever exhibited, but a chip mouse bit a piece from it. It weighed nearly five ounces, and I am sure that the mouse ate $\frac{1}{4}$ of an ounce. I do not mention it as a claim, but to show how large strawberries can be grown. Use rain water, and a handful of rich soil or old spent manure would be conducive to extra size. Eternal vigilance is the price of show strawberries. A visitor once asked “How do you grow such monsters.” My reply was—I sleep with them.

The effect of thinning out the fruit is so different upon different varieties that no general directions can be given; with some varieties restricting the fruit develops the foliage and runners, while others like the Gauthier persist in throwing off more fruit stalks to recuperate the loss. If “restriction” is kept up, the plant loses its fruiting habit instead of increasing it, as some would have us believe. Some sorts permit you to restrict the berries to 2 or 3 on each truss, while with others so much sap flows to these few that they either rot or get flabby and cease to grow. A tin can sunk by the side of a plant filled with water and a nail hole in the bottom, feeds the roots and is good when increase of runners is needed, yet dangerous when fruit is desired, as they are apt to wilt or rot with water at the roots. Surface water and a slight mulch to keep the soil cool and prevent baking is the best habit. Some sorts increase those fruits left after thinning, to a great size, others very little. These peculiarities prevent any rule being made that would apply to all sorts. With some prolific sorts you must thin or none are good. Study the requirements of your sorts as to their feeding and the soil they need, or take the advice of the originator as to growth habits and cultural requirements.

If the buyer of new sorts does not make up his mind to carry out the instructions that go with each variety, he is wasting his money and time. The ordinary culturist goes about it in this way. He receives a dozen sorts and sets them in a long row. The soil they are on may favor the growth and fruiting of one or two of the varieties and be uncongenial to the rest. Again, his method of culture may suit the requirements of some and injure others. At fruiting time he goes down the row, selects these one or two sorts that have done the best or answers to his standard idea in shape, size color and flavor, and he neglects the rest. The chances are that those sorts, like the stones the builders rejected, might in the end, and under different environment, prove the most desirable. Let us remember that he is dealing with a lot of hybrids all of which more or less hark back to their remote ancestry, some of which grew on the scanty soils of rocks, some on sand dunes, others on bottom lands, or hill sides or shaded nooks—products of every clime. I read that such and such sorts "do not do well in this locality." There is more in soil than in climate. On nearly every farm can be found clay, sand or gravel land, dry or wet land, northern exposure, southern exposure, bottom and highland. Find out from the originator what his seedlings need, and give it to them before you condemn.

All extra large berries are grown on summer or fall set plants. Have never been able to produce a show berry on a spring set or on a plant that had been fruited before. Plants received through the mails, or those checked in their continuous growth by any cause never produce large fruit; from this or some unknown cause, the plants from strawberry cuttings yield the largest and most perfect specimens. My prize berries have been grown on moderately hard, shallow soils. Hot, fresh manures can be put on in the early winter, but no nitrogen in the spring, a handful of old rotted ashes on either side helps. If fresh no good effects will be seen till the Autumn when the potash seems to stimulate the plant to bloom again. New land, rich in humus, is the best for strawberries. Old rich soils are not productive of large, healthy roots. Strawberries are such croppers that the soil they stand on is soon exhausted. A recent writer noticing the growth of these runners rooted in the alleys, says it shows the necessity for cultivation. I should say that it proves that the runners had found new and unexhausted soil.

For standard sorts, write to any of the below mentioned dealers—all reliable men. Buy from the nearest.

Matthew Crawford..... Cuyahoga Falls, Ohio.
W. F. Allen..... Salisbury, Md.
Harrison & Sons..... Berlin, Md.
F. W. Dixon..... Holton, Kansas.
Continental Plant Co..... Kitrell, N.C.
L. J. Farmer..... Pulaski, N. Y.
Flensburg & Potter..... Leslie, Mich.
J. T. Lovett..... Little Silver, N. J.
J. H. Hale..... S. Glastonbury, Conn.
S. L. Watkins..... Grizzly Flats, Cal.

I do not recommend "Potted Plants." When plants must be expressed, those lifted and their roots dipped in muck and properly packed arrive in better condition and bring better results than thumb potted plants with their restricted, felted roots which never straighten out. The claim that potted plants are more apt to live and produce better crops the next season is a catch penny invention as I have proven time and time again. If they are ordered, I can furnish them.

I offer no extra early sort but have one under trial which may be named next year. Early sorts which I have bought are unsatisfactory owing to their spindling growth and rampant runner habit. An early fruiting sort with strong, stocky plants, and runners not too numerous, would be an acquisition.

Shallow vs. Deep Culture In Treatment Of The Strawberry.

"Error once rooted in the popular mind, is not removed by anything less than a surgical operation. Arguments and facts do not quickly prevail against usage and prejudice, yet I trust that some of you readers, wishing large berries, will have the fairness to give shallow cultivation a trial, ere they say of me, 'I expect he grows his berries on paper.' I do not believe that roots sink deep for any purpose except to get support and water. The roots which gather food for trees in forests lie close to the surface in fact they lie just under and in the leaf mould so as to catch the rain fall before it evaporates. By mulching with soil or loose material we can reproduce the natural environments of trees and plants. Rain, manure and the shade from, and decay of crops, enrich the top soil, and permit the rich microbes to multiply their kind and keep down the poor ones. As soon as this rich strata forms, along comes the plough, and turns it under and brings up a cold acid strata, for crops to grow in. By the time this new top soil; from the action of shade, rain and frost is ready for plant life; after the finer clays have filtered down and formed another sub-soil like the first; along comes the deep plough again, turning the uncongenial subsoil up. This process is repeated ad infinitum. Now 99 out of every 100 fruit growers believe in a deep, loose, rich soil whilst the opposite conditions are indicated with me. During the past fifteen years I often read of some culturist who claimed big berries from deeply stirred, rich soil. I would say to myself, can I be mistaken as to this matter? and then would be given another trial of this method with the same old result—Berries no larger, fewer, lighter in color and weight; hollow centres and lacking in sugar and flavor. A few years ago Mr. Davis of Massachusetts described his plan for growing the Jesse. He made his soil as mellow as an ash heap and did not "think it fit for the plant unless he could thrust his arm into it up to the elbow." At that time I had a bed of Jessie cuttings, strong in top and roots. In setting out a 300 feet row, I trenched 200 feet 14 inches deep and filled with rich potting soil. To say the truth I was doubtful, and there-

fore not surprised to find that although the foliage was ranker, I got more and better berries on the 100 feet of row left untrenched. I refuse to believe that the difference might have been in the soil. If those gentlemen who practice deep culture, would adapt the best shallow methods, they would never go back to the labor and cost of deep ploughing. I, for one, am tired of testing their system, and shall not try it again till some one can give me good reasons for its benefit. Surely no one will contend that deep culture is more preservative of moisture! If roots penetrate deeper into it; it is because they instinctively fly from the light and heat a loose soil lets in. Many entertain the idea that root growth cost the plant or tree nothing. It is not true, for it costs as much plant energy to grow roots as it does limbs and foliage; the two terms branches and roots being almost synonymous. Consult any standard work on botany and learn that branches are only roots above ground, and roots are only branches or limbs, under ground. We have all seen Irish potatoes growing on the vines, and I read of an apple tree in a beer garden which was up rooted and planted top down. In time the roots sent out leaves, and what is more, blossomed and bore apples. Now we suppose the strawberry plant to be endowed with instinct of preservation and certain energies. Man studies and directs them and his knowledge enables him to produce the monstrosities which we have in the vegetable world. The plant says, here! I have a deep rich loose soil for root growth, and no danger of being crowded out by others. So why should I cast seed while I have a safer way of multiplying; out goes spring runners. Man should imitate natures economies and direct the strawberries energies to seed formation and in order to do so he must indicate by treatment whether he needs fruit or runners.

He can restrain root formation by making difficult conditions. He gives a hard, shallow soil or runs a knife down and severs some of the deep roots. Nature does no guessing. She sees the cause and remedy, and says, My hope of perpetuation (the animating instinct of all organic life) by means of runners and crowns is denied me, so I will bend all my efforts towards perfecting seed [fruit]. When florists want bloom they do not place a plant into a large pot but give it a small one and ram the soil down hard with a mallet. When a fruit tree can revel in root growth, it bears sparingly. Cut off some of its roots and its fruit increases. I have for many years exchanged horticultural ideas with Matthew Crawford, Esq. In answer to my views on this subject he wrote on Nov. 21, 1898. "My faith in a firm soil increases every year. Last spring I had no ploughing done, except when I wish to bury rubbish or manure. My best fall set plants are on unploughed ground." The editor of the "London Gardeners Chronicle" in June issue says. "All the finest examples of the strawberry I have yet seen have been grown on warm, shallow and rather poor soil." Instead of letting the roots run down to China bring them to the surface by a light

mulch of any sort. After the fruit is set, you can feed as you would a coop of chickens, a little at a time, but often.

Field Culture.

By "Field" culture I mean extensive acreage for market purposes. For the late varieties use a northern exposure or land that inclines toward the north; for early sorts, a light, sandy soil looking south. If spring setting of plants is desired, give a good coat of manure, the fresher the better, your object being to get strong plants. Plough under in January if the weather is open about this time, but do not roll or drag. As soon as your plant bed begin to show life, dress your land; mark it off and set your plants. If you are going to use a piece of land with head land on all sides, check it off as for corn. Let your rows running north and south be five feet apart and those east and west be $2\frac{1}{2}$ feet apart. Put two good, strong plants in each hill. If your sort is a great crown maker or has more than one crown, one is enough. Cultivate both ways till time for letting the runners come. It will aid in working up close to the plants if the runners are cut off until August 1st. By this time the weeds have been destroyed and if the soil around each row running north and south is worked up to the plants, a little dead furrow in the middle will aid in draining the patch. Although the rows will have $2\frac{1}{2}$ feet on either side, the runners of most sorts will meet. No further work will be required except mulching till picking time. If a mulch is not put on they will be thrown out by frost on heavy land. Put on only enough to shade the land and keep the mud from spattering the fruit when it rains. Pine needles are an ideal mulch when obtainable. Potato and tomato vines also make a good mulch. If in the way, can be raked off in the spring. If the soil is not sandy the fruit will not be much spattered, as the foliage breaks the force of the pelting rains. As your land was manured before planting, a manure mulch would cut your yield and also force runner development after cropping—none of which you need if you wish the bed to stand for a second crop. Mow off the foliage soon after picking. Do not burn, as the tops will shade and build up the land. Instead of runners your plants will throw off new, clean foliage. Before mowing the tops off, procure some soil that is free from weed seed—bank soil—and mix half and half with wood ashes, and with some sorts you will have a few fall berries. Be sure and put no manure of any sort on until December, when you can then mulch with manure old or fresh. Manure once a year is enough. In single year culture, too much. Should have each year, 25 bushels of ashes for an acre.

Seedlings.

When I began hybridizing strawberries, I found no information in books other than known to all who have studied the botanical relation of the reproductive organs; so I give the following points to those who wish to create new varieties which may

please their taste or the demands of their markets. Do not let Nature do the crossing, for she would rather pull you back to old types than push you on to new. Have an ideal in view and work toward it. Generally the **shape** of the berry that you get the pollen from will influence your seedling, while the flavor and texture will "take after" the fruit of the pistillate. You may get something good from strong or rank out-crossing, but the seedling makes a poor breeder if you wish to use its fruit as a dam or sire on other sorts, unless it is bred back upon one of its parents. A few generations of strong out-crossing will produce sterility with either plants or animals, because it is against nature's laws. The only way to hold what you have, the only way to get prepotency or a parent that will stamp its likeness upon its offspring, is to breed to a related sort. You will not live long enough to see any bad effects, however close you breed in and in. There is no blot of ignorance upon the intelligence of our times as black as the belief that you reduce the size and health of animals or plants by line breeding. It is just the opposite. Sporting or atavism disappears gradually with purity of blood. Were I a young man I believe I could, by close breeding, produce a large fruiting kind that would prove as true to seed or name as the Alpines are. By this process I can conceive of a race of animals or plants immuned from all disease. Wild animals and plants with only natural selection are almost so because they breed close. The seed of all fruits are larger and more vigorous if the fruit is allowed to ripen or rot, although immature seed germinate sooner. I have a little sieve that lets all the small seed through. Save the biggest seed from the biggest fruit. The Chinese and Japs in creating their dwarf trees and plants, select the smallest seed from the smallest trees or fruits. Do not sow your seed in the fall. Seedlings are difficult to bring through a winter and you must wait 22 months before fruit is made. By sowing in January only 16 months. Sow seed in shallow flats, use light rich soil and cover 1-8 of an inch. I sometimes place my seed between moist pieces of blotting paper till they show sprouts, and then sow in flats. Place the flats in hot beds or a hot house. The sprouted seed show in a few days, the dry in about 16 days. Keep soil always moist. Shade a little at first. Must have warmth to make quick growth. As soon as they get their true strawberry serrated leaves, pink out into thumb pots or larger flats one inch apart. From these to open ground. They make rapid growth, and before the summer months have gone, they and their runners are as large as any old plants in the garden. If any show leaf disease, dig them up; but do not destroy because small or backward in growth. Often the largest and best plants prove the most worthless. Nor can you tell at first fruiting what seedlings are the best. Mark each seedling with a labeled number. Let each make six runners which are to be removed to trial beds, and a book account opened against each, giving good and bad credits to leaves, crowns, runners, vigor, size, parentage

etc., etc., and every point that might aid you in selecting what you are to keep for further testing. If a certain plant pleases you, you have the old plant and six to start with. This is big work and should you have, say 1000 seedlings to care for and make note upon, you can do little else. If your seed has been from fairly true breeders and selected, 900 of your seedlings will prove as valuable as the usual run of standard sorts. A hundred of the best should give you duplicates of nearly every strawberry in cultivation, and possibly you might get several better than any. A "Pedigree" firm says, "If you were to plant 20,000 seeds of the "Sample" fertilized by the "Aroma" probably not one would do better or as good as the "Sample." With selected seed I should expect a third as good and many better. These people wish to discourage new creations and know nothing about breeding, being only propagators and promoters of fake culture, they want you to buy old degenerated kinds; and their above advice reminds me of the fabled wolf who advised the sheep to get rid of their dog and place themselves under his care. If you wish to give names to any that show distinct qualities, send your names to the U. S. Pomological Division, this city, and you will be informed as to whether your names are in use. Since my "St. Louis" and "Taft" were introduced, two seedlings have been given these names, much to their injury. After a man has taken prizes and advertised a sort, there should be a law to prevent others from reaping the benefits—even if innocently done

We are asked to believe that the only difference between a seedling and a runner (stolen) is that seedlings have two parents and runners only one. A runner has no parent. If it has, to what gender and botanical order does it belong? In all, these "variations," so common to "Pedigree Breeders" and so rare to others did they ever find a runner that varied from the old plant in respect to sex? And these Michigan variations due to soil and other environment, if any, what good will they be when shipped and transplanted to other soils and environment? A Florida seedling might in Michigan adapt itself gradually to meet its new conditions. If the runners from it were sent back to Florida or elsewhere do you suppose the variations would hold?

The Question of Sex.

During the coming summer I intend to give considerable microscopic study to the inflorescence of strawberries. At present we are very much at sea on this important subject, "The Cincinnati Idea" of the requirement of a staminate for pistillate sorts prevails; yet there is a screw loose somewhere. I need more information, yet know enough already to advise my patrons to pay no attention whatever to dealers who say "This is a good pollenizer for that." Have four rows of this pistillate and one row of this staminate." I have in my hand a catalogue that advises its readers to set with a named pistillate, a row of a named staminate, because it's

a good pollinizer. Now to my certain knowledge this staminate, although it has both organs well developed, is in more need of pollen than the pistilate which has a few rudimentary stamens around the base of the pistils, bearing pollen. Among the few things I have found out in breeding is that some varieties bear pollen that is not prepotent to other sorts. Some of our hybrids hark back so badly that they perhaps require the pollen from one of their own race to perfectly fructify them. The great Dr. Lindley said: "The cause of the sterility of mule plants is at present entirely unknown." I locate my rows with due respect to sex, yet it seems to make no difference in results when I violate the rule. One of the finest yields I ever had was from a large patch of the pistilate Bubach. The nearest strawberry of any kind was a patch of wild sort on a hillside 200 yards away. In 1906 I fruited for the first time a fine seedling, and took off enough runners to make a row fifty yards long. Fruit was large and plentiful. Last summer it set such a heavy bloom that a visitor remarked that he wanted "some plants from that row for pollinating." Not being tested but once, I had none for sale. Although surrounded on all sides by strawberry beds this row did not yield a pint of berries. It was not from frost, as we had none at blooming time. I hope to find out the cause this spring. We are much over run by wire grass, and two years ago I had to plow under some rows which I wished to frunit twice, although I seldom practice any but the single year culture. I left a row of staminate seedlings called "Verynice." Although in almost the very spot where stood the Bubach pistillates eight years before, they almost failed to make fruit. The few runners saved, were examined last spring, and I found that their anthers as those of some of the standard popular sorts bore no pollen. I do not believe that the weather could have made them abortive, yet shall make further tests. Again—Put no trust in the winds, but pin it tight to the insects as pollen carriers; especially to a dear little bee dite.

about the size of a house fly—must find its name. As in the case of other blooms, there seems some years to be little nectar in strawberry blossoms, and the honey bee may not care to work on them for pollen only. So although I keep thirty colonies of bees, I find some years they are almost entirely absent from the beds. They swarmed on the strawberry bloom last year because, I think the frost having killed the cherry and plum bloom, they were short on pollen. When the weather is too cold or rainy during blooming the insects cannot come abroad and, and you can depend upon poor pollination in all fruits. Now about the universal belief that the winds convey pollen—Have found that it distributed very little of the strawberry's considering amount required. The pollen from tree blooms, when not sticky as the grains generally are, might become detached, and be wafted afar; but low growing plants are not so well off. The winds strike the earth in a downward direction and could only carry pollen a few feet. Those flowers (perfect) having their anthers mounted on long filaments, might have pollen shaken off by the wind and dropped on the stigmas, but those having sessile anthers or absent filaments, would drop their pollen because the anthers are below the stigmas. I have on two occasions, smeared panes of glass with linseed oil and set them up a foot or more from the ground when there was a good breeze, yet very few grains of pollen were caught. It strikes me that our idea of a pollen laden air comes from the false impression that what we perceive and call sweet smells and odors is pollen dust striking the olfactory nerves. Such is not the case, for the odors of flowers, good or bad, emanate from the nectarines. Some varieties have staminate blooms and pistilate blooms on the same plant; others have staminate blooms on one plant and the pistilate blooms on another. I have a seedling which present in three forms in a single plant—staminate, pistilate and hermaphro-

PEDIGREE "BLISTERS."

I have before me a book, "Great Crops of Strawberries and how to Grow Them." If the "Thoroughbred pedigree" men who edit it are to be taken seriously, a strawberry patch can beat a Texas oil well, which spouts dividends every minute. However, those who have compared the Pedigree plant with "common" sorts find this book more full of promise than fulfillment. Having laid down certain postulates with which to improve given varieties of strawberries, it then labors to hide the truth instead of teaching it. It is very plausible reading to the uneducated and those who do not look closely into its statements. In the 1898 Year Book is an article on the "Improvement of Plants by Selection." Instances are given of improvements in plants and flowers by both bud and seed selection—but no fruit is named. The Pedigree men quote or

misquote this article from this book in their catalogue, and say: "It confirms all the claims we have made." It does nothing or the sort. "Their selection" and "repression" methods are applied to this article as they are to plants, to the end that they might deceive. They "select" and isolate the lines that seem to support their claims, "suppress" those unfavorable and mutilate the rest. "The unity of the individual taken as a whole is a factor of prime importance in selection, and should be closely recognized by everyone striving to secure improved pedigree plants." This is only a more verbose repetition of Vilmorins. "The unity of character of any single plant is the main factor in the work of pedigree or grade breeding." Both, as shown in the lines that followed, have reference to seed and **not bud pedigree**. Briefly explained: If a plant or

tree shows a few double or semidouble blooms, the seed from them will be like the rest. If **all** the blooms on the tree were double or semi-double, showing "unity of character," then some of their seeds would reproduce this feature, and further selection of seeds from the trees showing "unity" would in time fix the habit and give you a double variety. I shall give only one more instance of the perversion of truth in their quotations. The article says: "Every farmer and horticulturist should devise for each crop a systematic method of selection **similar to that described in the case of sea island cotton**, so that the general crop may be grown continually from selected pedigree stock." The "Thoroughbred Pedigree" book and catalogue cunningly omit the eleven underlined words, for fear their readers might know that all improvements in sea island cotton have been made by selecting seed from the best samples, and of course should be called selected pedigree stock as much as a race of horses could. It does not endorse their bud pedigree folly, and they had to dishonestly mutilate the lines to falsely convey that impression. The book and catalogue say: "It is difficult to get valuable varieties through seedlings." This is an eye-opener, since **all** of our varieties have originated from seed. This very Year Book article from which they quoted states to the contrary, but their instincts of insecurity, "selection" and "restriction" made them sidestep this concluding paragraph: "The most feasible and by far the **quickest** way to secure **decided variations and new creations** is by hybridizing different species and sorts, crossing with related sorts."

Change and fashion are the parents of trade. Evidently Prof. Bailey does not think so. The hundreds of old sorts are gone or going. If no new varieties are to take their places, where is our fruit to come from? "Improve what we have?" No variety has ever been in the past, and no hope that it ever will be done in the future. But **have** we too many? The peach, pear, cherry and apple lists are not as long as they were forty years ago, because the demand for commercial sorts has shoved aside many of the old. The increase in plums and apples is not real, being due to transfers from other countries to this—Russian apple and Japan plum varieties. Taking into consideration our increase of population and territory occupied, we have fewer varieties of strawberries than forty years ago. The English list at that time comprised 92 sorts. Laxton Bros., of Bedford, largest strawberry nursery in England, lists now only 75 sorts. In 1856 Pardee described 25 sorts, and added: "I could describe 100 more varieties which I have personally tested." According to an old strawberry list, we had 90 sorts in cultivation in 1870. Mr. Allen, of Salisbury, Md., has by far the largest acreage in America set to strawberries. From the 1907 catalogue of the following firms I find the number of varieties offered by each: Allen, 110; Dixon, 88; Flansburg, 65; Farmer, 57; Todd, 55; Kellogg Co., 49; Hale, 30, and Lovett, 20. Of the 90 sorts on this old list of 1870, the Sharpless and Wilson only remain.

I regard the late Peter Henderson, of New York, as one of the foremost horticulturists of our times. Besides being a practical gardener, he had a scientific turn of mind and was a close observer of cause and effect. In "Gardening for Profit," page 272, can be found his views on the subject under hand. "I believe there is no such thing as permanent degeneration of any fruit, flower or vegetable that is raised from cuttings, graft or root." "Permanent improvement, in my opinion, can only be made by the selection of the fittest specimens that have been raised from seed proper." Mentioning the Concord grape and Sharpless strawberry, he says: "They have merits that the public recognize, but **all the arts of man** cannot further improve these so that their 'progeny' (to use a convenient, though perhaps not a strictly correct, term), when increased by sets, layers and cuttings, will be permanently better or worse than when first called into existence" "Such parts are not seed proper, but are merely parts of the same individual."

Henry de Vilmorin, F. R. H. S., has the following to say in regard to the vegetative parts of the strawberry: "Their short-jointed, thick stems bear from eight to twelve leaves, at the axil of which a bud exists, which seldom becomes abortive, and mostly develops either into a branch similar to the main stem, or into a runner, or into a flower stem; these appendages being in a manner equivalent to and, so to speak, interchangeable with one another. The runner at first sight appears as different as possible from the ordinary leaf-bearing stem. It becomes very plain, however, upon closer inspection, that it is merely an elongated branch, dissimilar to the original one simply in the great length of the internodes and in the diminutive size of the leaves, which are mostly reduced to mere fracta. But the runners show their identity to the normal branches in producing from their nodes exactly the same appendages as the primitive stems do—viz., regular stems, runners, and even flower stems—and in bearing also abortive axillary buds occasionally. A vegetable axis which reproduces another axis similar to the one from which it proceeded, cannot be called different from it in nature. Now, it is the case, both in the alpine and in the large fruited strawberry, that runners issuing from the normal stems produce from some of their axillary buds new stems exactly like the original stems."

Degeneration And The Necessity For New Kinds.

I submit this law: All varieties of fruit dependent upon seed development must deteriorate when that variety is propagated only by means of buds, grafts, suckers, cuttings or offsets. Under the operation of this law, no given variety of strawberry not true to seed can be improved or even kept up to its standard by bud selection or any other treatment. I arrive at this conclusion by having in mind the well-known formula, Any function continually suppressed ceases to exist. Nature being economical in her processes. (For instances, see elsewhere.) Now, if a variety of strawberry by constant runner

propagation loses the habit of making seed, its fruit would go. And this is precisely what happens. I have been engaged in hybridizing strawberries for twenty years, and declare that the greatest fear in sending out a seedling is the doubt as to whether it will prove long or short lived. Here is where it is important to know the blood lines of your breeding stock. Alpines come true to seed, but if propagated by runners, rapidly diminish their fruit after the third year. In Italy they have a fine wild sort which the gardeners dig up and cultivate. They increase their size, by rich feeding, up to the fourth year, and then they are thrown away and more wild ones are lifted. Our wild sorts act in the same manner, but last longer. Now, if your seedling has any of these blood lines (and many have), here is another reason for asserting that the trend of the strawberry is downward. I have had seedlings which were extra productive at first fruiting, to lose this feature in six years. Some sorts have outstayed their contemporaries in this respect—the Wilson, Sharpless, Gandy and British Queen conspicuously so; yet we should recognize that the two causes I have named have reduced their fruiting habit to a point almost below the line of profit. In spite of these facts, we have, as Mr. Farmer says, "men who are brazen enough to tell their patrons that by keeping a strawberry plant under restrictive fruitage it develops its fruit-producing organism." This is their claim for improving every variety. A moment's thought will show that it is just the other way, and that they are working towards sterility. The strawberry has two ways to reproduce itself—by seed and by runners (crown and runners being the same). Now, deprive the plant of one of these agents, and its instincts of preservation make it throw its energies to the only means left, and instead of developing fruit organisms in the old plant, you develop the runner organism—so well that the old plant is exhausted thereby and in many varieties becomes blind. It should torture the buyer's credulity to believe any such rot. If both fruit and runners are "restricted," then both are developed and their relation to each other unchanged. If this "fixes the fruiting habit," as claimed, is not the runner habit fixed as well? Suppose the runners are cut off, the fruit would increase thereby, but this catalogue says this would produce pollen exhaustion. Now, there is no other way to treat plants than those I mention, and none lead to improvement. So that their claim cannot be supported by any method they teach.

The Japanese dwarf their trees and plants by frequent transplanting. We all know that several liftings of plants, such as celery and tomatoes, make them short and stocky. In other words, they develop a tendency towards "Nanism." This practice for years may reduce the size and vigor of a variety, and is possibly another cause of degeneracy. Perhaps the reason why a strawberry plant grown from a cutting makes the largest fruit, may be traced to the fact of never having had a check to its root growth. The Sharpless and Wilson are much reduced from their former size, even in rich soil."

"Pedigree" Strawberry Plants.

"In order to have a pedigree, plants must be grown from seeds, and in order to have a known pedigree—that is, "a registry of a line of ancestors"—they must be grown by intention, not by accident. The most of our popular varieties of strawberries are chance seedlings. They have no known pedigree, nor can they by any possibility acquire one, for their parentage is unknown and must forever remain so. Thus we see that the word "pedigree" cannot properly be applied to strawberry plants grown from other plants, and hence there are no pedigree plants in the sense in which the expression is popularly used at the present day. The word "thoroughbred" used in a similar sense is also a misnomer.

Plant Breeders.

"The growers of so-called pedigree plants are propagators, not breeders. The author writes a book; the printer increases the number of copies, but this does not make him an author. A true plant breeder is a grower who takes advantage of hereditary tendencies and endeavors to perpetuate points of excellence and combine desirable characteristics by producing plants from seed. He continues this process from generation to generation, and if he keeps a record of the parentage, his productions have a known pedigree. Plants grown by this method are real pedigree plants.

Professor Sandsten, the plant breeder of Wisconsin Agricultural College, says that there can be no plant breeding without seed."

Bud Variation.

"Next comes the question, Is there then no such thing as bud variation? There is, but it is temporary. It is found in fruit-bearing plants, vegetables and flowers; but it is due to conditions and cannot be made permanent. The idea that a variety can be improved by selecting buds from the most perfect specimens for propagation, seems so plausible at first thought that almost any one might consider it a forward step in the line of progress, but further consideration reveals the fallacy upon which it is founded. The proposition is not new, but dates back nearly or quite a century.

Some years ago a Michigan grower advertised "pedigree Wilson plants," claiming for them renewed vigor and largely increased productiveness. We planted some of them in these parts, but did not see the renewed vigor or the increased productiveness. So I have not much use for the Wilson except on a small scale for comparison.

A well-known strawberry grower of Iowa wrote me last year that he had propagated the Louis Gauthier for six years with a view to increasing its inclination to bear in the fall, but had gained nothing.

Professor Troop, of the Indiana Experiment Station, wrote last month, in reply to an inquiry: "The pedigree plants were among the poorest in point of yield this last season. I am going to give them another trial."

The Ohio Experiment Station, in its strawberry bulletin for 1905, gives an article on "Pedigree Strawberry Plants," also an account of tests carried on at the station, from both of which I will quote in closing."

"The word 'pedigree,' as it is used with reference

to strawberry plants, is a misnomer. It tends to confusion in the minds of many, and leads to deception. The word is used out of its true sense to convey the belief that a condition exists which does not exist and cannot exist, or if it could exist, would have no value." (Professor S. B. Green, Minnesota Experiment Station, in "Farm and Fireside," Feb. 10, 1908.)

"Untruthful" is What Others Say.

Bulletin 166, Ohio Experiment Station, says :

"The word 'pedigree' has come to be used with reference to plants in a sense which conveys a meaning that is altogether untruthful. An animal with a pedigree is one having a known ancestry. The parentage on both sides must be known for one or more generations."

"The Experiment Station has put some of these so-called pedigree strawberry plants to the test, and they have been found wanting. Not one has shown any superiority over the same variety from other sources."

Mr. Matthew Crawford, the dean of the American authorities on the strawberry, says the following on the subject of "Thoroughbred Pedigree Plants":

"Great claims are made in the matter of increased productiveness and a diminished number of runners. As yet we have little or no proof, merely assertion. Is this assertion made purely in the interest of truth, or is it to the pecuniary advantage of those who make it most frequently that the public should accept it as beyond question? If it is made disinterestedly, why are there mixed with it illustrations and statements that have nothing to do with the case under discussion, but merely tend to throw dust in the eyes of those who may be seeking the truth? Throughout the discussion of the question of bud variation, illustrations of improvement of fruits, grains, flowers, and even animals, through selection for seminal reproduction, are brought in to strengthen a theory to which they bear no relation. This mixing of the discussion of two questions, the one settled, the other by no means settled, is so misleading that it appears to me incapable of explanation on the ground of oversight.

"For a number of years there has been an effort made to boom so-called pedigree plants. Most extravagant claims have been made for them, and at the same time, common, every-day plants have been written down, and every effort made to bring them into disrepute. They have been called 'scrubs' and 'mongrels,' and most scurrilous remarks have been made about all growers who refused to fall in line. During all this time no proof has been offered as to the soundness of the new theories. We have heard of 'potency,' 'pre-potency' and the 'vascular system,' terms used by breeders of animals. With a view to getting some facts, if possible, I have sent the following to a number of horticultural papers to be inserted as a reading notice and the bill sent to me:

M. CRAWFORD, of CUYAHOGA FALLS, O., who has made a specialty of the strawberry for over forty years, is collecting information concerning "thoroughbred" or "pedigree" strawberry plants. He wants to correspond with any person who has had experience and can give facts—not theories—that will enable him to arrive at the truth. He also wants to buy a few "mongrel" or "scrub" plants of a number of well-known varieties that have been grown under neglect until they have lost, or nearly lost, the habit of blooming. He hopes, by corresponding and experimenting, to obtain information that will be of value to strawberry growers. If you can help in this matter, either directly or by referring him to some one who can, please do so. In return, Mr. Crawford will send you, in due time, some valuable information on this subject.

"As the 'National Fruit Grower' has given great prominence to the pedigree plant business, I assumed that some of its readers could throw light on the

subject, and the reading notice was sent to it for insertion. Immediately I received the following from the editor:

MR. M. CRAWFORD,
Cuyahoga Falls, Ohio.

St. Joseph, Mich.
February 8, 1904.

Dear Sir:—We acknowledge receipt of your undated favor, with enclosure of reading notice for publication in our February issue. We have not met you personally, Mr. Crawford, but from your correspondence and the position that you take we would judge you to be in stature about three and one-half feet high and to wear about four and one-eighth hat, and we wish to advise you that it is not the mission of the "National Fruit Grower" or this company to fight other people's battles or throw mud for them."

The rest of the letter was equally insulting to this aged and honorable gentleman, but I have not the space to give it. The strawberry plants asked for came in great numbers and were set out. At fruiting time they bloomed freely and bore as well as ever. Twenty years ago, wishing to get hold of some old Downings and Wilsons, I got permission from a country blacksmith to take up a dozen or two from his lawn, then in grass, but twelve years before a strawberry bed. It was late in the fall. I lifted no soil with the roots, and removing the old stumps or lower black root stock, set them in good soil on the sunny side of a hill. The weather was open till Christmas, and I laid on a thin rye straw mulch that let in some light and protected them from the wind. The crop of fruit they bore convinced me that it was just as difficult to change a variety by neglect as by attention.

I also some years ago sold short on Laxton's Commander, and wishing to replenish my stock, ordered a thousand through my postman, who was buying from a pedigree firm which listed the Commander. They came, and proved to be the smallest lot of "tail-end" matted row scrubs I ever received. Only 80 out of the 1000 were large enough to justify setting out. At fruiting time they were found to be untrue to name and otherwise worthless. I wrote to the firm and was informed that they had never heard of Laxton's Commander. They had evidently not improved any other Commander.

Mr. Farmer, of Pulaski, N. Y., another authority on the strawberrf, has the following to say in his interesting 1907 catalogue :

"The So-Called Pedigree Plants.—We have refrained from saying much on the pedigree idea of propagating strawberry plants, although many of the best authorities of this country have steadily attacked it. But the pushers of this theory are getting so brazen, insinuating as they do that no other plants are fit to plant for big crops except theirs, that one cannot keep silent for fear we will be catalogued with the boy who did naughty and had nothing to say. To epitomize this matter: We think that this theory of pedigree strawberry plants, no matter what its original exponent actually thought, is but a scheme to attract buyers of strawberry plants that otherwise would purchase their plants elsewhere. These schemes in one form or another have been hatched by ambitious strawberry plant sellers ever since the day we began growing strawberries, nearly twenty-five years ago.

"Had I believed in this theory, I would have lost no time to get a stock of these so-called 'pedigree plants.' The facts are, that, while I have shipped several orders to this 'pedigree' concern, I never have received a single plant from them in all the years I have done business."

I have gone to some trouble to verify my statements, because buyers who have been deceived by dealers who publish fakish claims, may demand proof—and should. These dealers have injured honest nurserymen, as well as the papers which carry their "ads", by destroying public confidence. It is also difficult to sell new fruits because a well-known horticulturist proclaimed a few years ago that "what we needed was not new varieties, but improvement in the ones we already have." It is easy to find faults, but difficult to find a remedy. His theory is old, and has failed over and over again during the past hundred years. While it has not accomplished any permanent and valuable results, it has doubtless started many experiments at improvements by bud selection; and one large firm has seized the theory to deceive the public by claiming that it has, by "bud selection," improved every variety it catalogues: as the "Gandy," "Crescent" "Bubach" have grown better and better each year for twenty years—what wonderful creations they must be by this time. If you are silly enough to imagine a grain of truth in such rot, write for half dozen of their plants and grow them under the same conditions with six of your own or six bought of any one of the men whose names I shall mention elsewhere. I am positive that although the plants of these honest men may be better, no permanent difference will be found between the two lots. Although a single life time is too short to work any reliable change by bud selection, this firm states that it is quicker and more certain than improvements by seminal or seed propagation. Some years ago I wrote for, and got, the opinion of many of the leading horticulturists on this subject: Shall only quote here the opinion of the great hybridizer, Luther Burbank: "I would expect a million valuable variations from seeds when I would expect one from bud variation." Don't waste your time and money on the unattainable. The only selection that can improve upon our standards is that which has advanced them to the high level they have reached. Select the best seed, from the best fruit, off the best plant of the best variety.

The "pedigree" men assert that "each will make as new and as distinct an individual as though grown from seed." They refute their own theory in the very next sentence. "But differs from the seed from having the identical vascular system of the plant from which it was grown." If in seed reproduction we have in the seedling a "different vascular system," and in the runner "the identical vascular system" of the old plant, how can it be distinct? Separate the stools of a strawberry plant, and each will make an independent plant the same as the runner bud. In fact there is no difference between the two except in the length of the connecting string. I have grown seedlings having runners all the way from no distance to 3 feet long.

They are not distinct individuals in a scientific sense, no more than a branch of a tree which springs from a bud. It is an integral part of the tree, not born; for birth implies two parents. The branch of

the tree or the runner of the strawberry can be cut away it is true, but it is a detached portion—a subdivision which can be indefinitely subdivided. When nature needs varieties she gets them through seed and their type is fixed; else there would be no stability. Man must conform to her laws if he needs new creations. The only concession that nature makes is that to environment, yet she does not allow even here the changes or variation to be permanent. These changes are compelled by the struggle for existence. If given their old environment they quickly revert to their original type. Runners set around a plant; the roots of each may encounter different conditions and show variations in size, color and vigor. Why not? One roots over a clod of manure; another on a hard spot or over a stone or shell; perhaps a grub is gnawing the roots of one. The foolish on their knees say, "here are valuable bud variations," when in fact it is only soil variation. Nature is too just to her subjects to allow these accidents to make structural changes. Dig up these runners and set them where there are no soil variations, and all will soon prove alike.

The fact of a runner's ability to root, to be detached, or in time to detach itself, does not make it distinct. It is still a part of the old plant, thrown out to find a less exhausted spot and better chance to maintain its struggle for existence. It is wonderful to see how alike they are. I can join honest Mathew Crawford in saying that he has handled millions of Gandies, Bubachs and other sorts without finding the slightest variation. Mr. Hale once wrote me that he had never seen any. It is a school boy argument to assert "that there are no two things alike." For all intents and purposes many things are alike; and were it not so, the earth could not hold together a minute. It suits the business of the Pedigree men to tell us that the old Wilson and Sharpless have gone down from neglect because people, unlike themselves, have always selected the poor instead of the best runners. If they had, it would have made no difference. You can no more **permanently** injure a variety by selecting the worst than you can improve it permanently by selecting the best. Is it true that other people always select poor runners? On the contrary, any man making new beds digs up the best layers. If I should allow an ignorant negro even to take up a few dozen, do you suppose he is going to select the worst? As I said above, there would be no change from either system, except that a weak plant is more apt to yield to disease and the weather. Many people use large Irish potatoes to cut for seed planting, yet no variety of Irish potato has been improved. For the past hundred years or more, mere strings—or the poorest sweet potatoes—have been used for bedding; yet the "sweets" have held their own as long as the Irish. If anything, the sweets have held up better except in the matter of seed-making, which habit, (as with the horse radish), it has lost from being so long propagated by buds. And the strawberry would if a variety was kept as long as some of our old sweet potatoes have been. None of

the old Irish potatoes of my boyhood are in cultivation now, and many of those of more recent date are showing seed sterility. A sweet potato or pumpkin vine may run 20 feet, and each node or joint can be rooted and cut into as many sections as there are nodes, yet all are a part of that one vine, and the vine a part of the old tuber. A sow has a dozen pigs; they come from their birth detached units, with distinct vascular systems of their own—true offsprings of two parents—and could not have come into existence without the sexual act. Now, what excuse have we for using terms like breeding, offspring, child, parent, son, daughter and birth (which have from time immemorial been applied to ovarious or seminal reproduction), and use them in connection with plant subdivisions, buds, etc.? Plant breeding and pedigree shou'd mean just what animal breeding and pedigree mean—sexual crossing and history of parentage. Yet I regret to say there is a tendency among plant pathologists to disregard long usage and to display their poverty of invention by misapplying those terms.

The late Professor Stayman said: "do not believe it possible to improve any variety of fruit, or that we can select buds from a tree that will bear sooner or better than the original variety, or that there are different types of the same variety. That all the variations and improvements that appear are the result of soil location, cultivation or meteorological conditions. That, instead of a variety being susceptible of improvement, there is a natural tendency to degenerate and decay. **Unless we breed new and better varieties, adapted to our wants, we will soon be without any value.** Instead of fighting the different insect and fungi pests which prey upon the old, degenerate and decaying varieties we should better go to work on new creations of fruits. The rust that once threatened the destruction of our strawberries has nearly disappeared by new varieties which are rust proof."

It is evident, from the pictures of spraying machines at work on the "thoroughbred pedigree" plants, that rust and spot has not been "improved" off those old sorts. What's the good of selection if the fellows on their knees can't find a few plants immuned from rust and spot to be used as "breeders"? It makes me think that "selection" is after all only worked into their bill of attractions and not put into practice. We hybridizers and introducers are placing on the market varieties that are rust-resisting; and even shou'd these diseases (which with the thin-leaved kinds come with old age) overtake them, we will have more new, clean-leaved sorts to replace them. Better invest a dollar or two in getting a start of new kinds than to buy a spraying outfit to the injury of your soil and bank account. Had I an old sort, or a seedling, which yielded to rust or spot, would throw it away, no matter how superior its fruit.

Bud Variation.

There is no doubt but that plants worked for changes in vegetative parts—leaves and flowers—may be improved by bud selection; whether permanently or not we cannot debate here. This is no new discovery. There are always extremists in every branch of science, and those who contend that

by such means a distinct variety can be evolved, just as well as by seminal reproduction, are holding themselves up to ridicule. The great authorities agree with 'Weisman' in stating that "We must ascribe all varieties to sex or seed breeding." To improve the fruit and vegetative parts at the same time brings the experimenter from simple to complex laws with their limitations. For instance; we could probably, by selecting the largest strawberry plants, produce a plant three feet tall—although even here we could work faster and surer with seed. To do this, we would have to work away from fruit production; it being not necessary to vegetative increase. In fact, in order to get the highest results the fruiting habit would be lost. This change would not be permanent, because if left alone, your three foot plant would go quickly back to where it started. Suppose when you had gotten the three foot plant, you were foolish enough to say, now that I have my big plant I will select those having the most fruit (for some might revert) and work to get big berries. By restricting its runners you could go down the very same steps you came up, and in time find in time, at the bottom, the identical plant you started with. Had you started in the first place to increase the size of your berries at the expense of your foliage, you are up against a complex situation because a certain quantity of foliage is necessary to the fruit requirements. Here is where the "pedigree men" work the "gold brick" on their patrons. They tell how selection has made plants thornless, (although I know of none made so without crossing) free from disease, improvements in lettuce, pie plant, etc., etc.; what selection had done for animals; giving pictures of cows, horses, athletes and even steam engine and watches—and why not? Engines are not more far fetched in proving "bud breeding" than animals are. As they do not raise seedlings, the label "Breeding" over their beds, would be just as appropriate against an engine shop. They can no more breed two buds than they can cross an engine on a watch. And their plants have no more claim to a pedigree than the watch has. They got their Gandy from Mr. Jones up the road. Mr. Jones got his runners from Mr. Smith; Mr. Smith got his from Mr. Brown who got a start from Mr. Oliver Gandy of New Jersey, who found it in a fence corner. They got their watch from Mr. Jones for a bad debt. He got it from Mr. Smith; Mr. Smith bought it from a pawn shop, and it was pawned by Mr. Brown who found it. But all these pictures and juggling with words, fools the "corn-tassel into buying. Read their argument:—Instead of teaching the truth, they labor to hide it. You see no picture or name of fruit tree, bush or vine that is due to or improved by bud variation, because there are none. The improvements of every variety of every known fruit has been made by crossing—true breeding. And no strawberry variety has been improved or even changed, in any respect for good or bad, except from the continued propagation by buds (runners), which is degenerating and proves the necessity for new creations by hybridizing.

Some years ago I wrote to the U. S. Horticulturist, Wm. Saunders, and asked if there had been, during the last 100 years, any kind of fruit with bud origin or bud improvement. And this distinguished man replied curtly; "I cannot recall a single fruit that is the result of bud variation, neither do I think that there are any." In connection with strawberry culture the whole theory is folly; and time, labor and money wasting, as long as we have the quicker and surer road to improvement by seed selection. In quoting the Year Book article on Plant Breeding, the pedigree men side-stepped the following, (page 368). The most feasible and by far the quickest way to secure decided variations and new creations is by hybridizing different species and sorts, crossing with related sorts."

It has been believed that "Pedigree" means the history or record of ancestry. A Pedigree firm says "It means skillful breeding." According to this definition no man can have one. There is too, as much deception in the use of "Breeding" as in the word "Pedigree." These men do not grow seedlings—have no need to, since they simply get yours and advertise that they have been improved by "Selection" and "Restriction." Why buy from the originator when his seedling can be had "improved." If the buyer was not so gulled by these taking statements he would buy also some from the originator and see if there was any difference. He

is not trusted however with the name of the originator. Other catalogues give name of originator or introducer whenever known. It seems odd that in this catalogue describing 49 kinds, there cannot be found the name of a single originator. The average buyer knows little about strawberries and when deceived, he carries his resentment to the whole trade and ceases to buy. So it is in the interest of every dealer to expose and resent the methods of men who are engaged in discrediting a hitherto honorable profession. They do not handle any of my berries and are not competitors so far. Buyers should know that if these "Thoroughbred Pedigree" plants are not as represented—and they can't be—that they have the right to ask for the return of money obtained by false pretenses. They can also ask for the pedigree of any plants they buy and if not furnished, action at law can be had against the seller just as in the case of a horse or dog bought with guaranteed pedigree. I think these men would have some trouble to convince a jury that their plants are 'pedigreed' when they cannot furnish the true parents of any of them without a world of guessing. Horticultural expert testimony from the experimental stations would quickly settle the fake claim of "improvement." Nor can the papers that imposed these people upon them escape responsibility. They would have to either see that you got your money back or pay it themselves.



DUPLICATION GOOSEBERRY—(See Page 4).